A LIZARD AND SNAKE CENSUS ON ATLEY STATION

By G.G. THOMPSON.
Edith Cowan University, Joondalup Drive, Joondalup, W.A., 6027.

INTRODUCTION

During 1966 and 1967 E.R. and H.D. Pianka spent 35 days collecting reptiles at a site on Atley Station, approximately 50 km SW of Sandstone in Western Australia. They caught 648 lizards from 28 species (Pianka 1986) and eight snakes from six species (E.R. Pianka, *pers. comm.*). During 1991, sixty pit-traps were installed approximately 5 km east of the collection site used by Pianka (site 'A'; 1986). A comparison of the number of species of lizards and snakes caught during these two investigations approximately 25 years apart is reported.

MATERIALS AND METHODS

Sixty 20 litre plastic buckets were installed as pit-traps with 5 m of 300 mm high fly-wire drift-fencing between 22 and 25 November 1991 on a section of Atley Station approximately 2 km East of Zado Bore (119°07'E, 28°25'S; 55 km SW of Sandstone). The pit-traps were laid in 10 rows of 6, with approximately 50 m between rows and 30 m between pit-traps in each row. This site is approximately 5 km east of where E.R. and H.D. Pianka collected lizards over a 35 day period during 1966 and 1967.

The study site has red loamy soils which support a vegetation consisting mainly of patches of spinifex (*Triodia sp.*) grasses and small trees. The trees are predominantly mulga (*Acacia aneura* and *Acacia craspedocarpa*) with a lesser number of mallee eucalypts (*Eucalyptus spp.*). The topography of Pianka's site and the site in this study are the same. The Station owner indicated that neither area had been burnt in the last 50 years.

The pit-traps were inspected every morning (0700 to 0900 h) and every afternoon (1500 to 1700 h) from the 22 to 30 September and 24 November to 14 December 1991. All lizards caught in pit-traps had their snout-to-vent (SVL) and total length (TL) measured. Toes were clipped to enable individual identification of those recaptured. Marsupial mice caught in pit-traps had notches cut in their ears for later identification if recaptured. Other than the small number of animals that died in the pit-traps, all were released near the point of capture.

E.R. Pianka (*pers. comm.*) reports catching his specimens using a wide variety of methods including extracting them from hollow trees and burrows, shooting them with .22 birdshot and catching them in spinifex tussocks, leaf litter and under fallen logs.

RESULTS AND DISCUSSION

A comparison of species and the total number of reptiles caught on the two occasions by the two different methods is shown in Table 1. Failure to capture *Delma fraseri* and *Diplodactylus elderi* in pit-traps was possibly due to their scarcity and their preference for staying inside large tussocks of spinifex. *Heteronotia binoei* is difficult to catch and is usually collected deep in burrows or underneath rotting logs, *Lialis burtonis* is uncommon and *Morethia butleri* is an exceedingly cryptic litter dweller (E.R. Pianka, *pers. comm.*). Large *Varanus gouldii* and *Pseudechis australis* easily climb out of the 20 litre buckets. It is suspected that the adult *Varanus eremius* may also be able to jump out of 20 litre bucket pit-traps or are very "pit-shy". Local station owners indicated that *Moloch horridus* are seen irregularly throughout the area.

Cryptoblepharus plagiocephalus was caught in September but not in the November–December period while the seven *Diplodactylus strophurus* were caught only in the November–December period.

The cumulative number of species caught over the thirty day pit-trapping period is indicated in Figure 1. As would be expected most of the species that were in the area were caught in the first 10 days of pit-trapping and it is only the scarce species that were caught in small numbers after an extended period of time. Interestingly, James (1994) reports catching 32 species in 30 days of pit-trapping using 12 arrays with 17 similar plastic buckets as pit-traps in each array at his study site south of Alice Springs in central Australia. He subsequently went on to catch 39 species after 180 days of pit-trapping. This would suggest that additional pit-trapping at the Atley site over an extended period

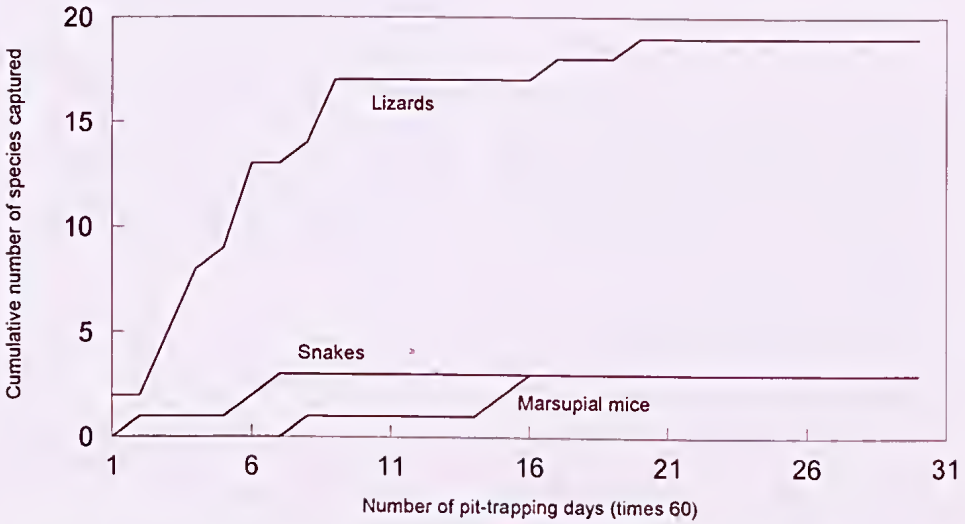

Figure 1. Cumulative number of species caught in pit-traps on Atley Station.

Table 1. Lizard and snake census of the Atley site.

SPECIES	PIANKA 1966	1991 STUDY
LIZARDS		
Caimanops amphiboluroides	13	*
Cryptoblepharus plagiocephalus	24	2
Ctenophorus inermis	47	7
Ctenophorus scutulatus	74	*
Ctenotus atlas	23	5
Ctenotus grandis	7	*
Ctenotus leonhardii	86	31
Ctenotus pantherinus	5	0
Ctenotus schomburgkii	53	91
Delma fraseri	8	0
Diplodactylus elderi	12	0
Diplodactylus granariensis rex	0	5
Diplodactylus pulcher	16	5
Diplodactylus squarrosus	0	1
Diplodactylus strophurus	30	7
Egernia depressa	12	4
Egernia inornata	10	3
Gehyra variegata	32	1
Heteronotia binoei	6	0
Lerista m. macropisthopus	0	4
Lerista muelleri	3	3
Lialis burtonis	1	0
Menetia greyii	3	7
Moloch horridus	3	1
Morethia butleri	6	0
Pogona minor	14	1
Rhynchoedura ornata	132	29
Varanus caudolineatus	12	7
Varanus eremius	13	*
Varanus gouldii	2	*
Varanus tristis	1	#
SNAKES.		
Pseudechis australis	2	*
Pseudonaja modesta	2	*
Ramphotyphlops bituberculatus?	1	0
Ramphotyphlops hamatus	0	4
Ramphotyphlops sp.	1	0
Rhinoplocephalus monachus	1	0
Vermicella bertholdi	0	1
Vermicella semifasciata	1	2
MARSUPIAL MICE.		
Sminthopsis crassicaudata		5
Sminthopsis youngsoni		20
Unidentified marsupial mouse		1

* seen or caught but not in the pit-traps
# tracks seen

would probably yield a higher number of species, however, many extra pit-trapping days would be required for a small increase in the number of species.

Pianka (1989) suggests the Earth's most diverse lizard fauna occurs in the Great Victoria Desert of Western Australia with at least 39–42 different species, and perhaps as many as 50 species, occurring sympatrically. This is in contrast to only 6–17 sympatric species found in the North American and Kalahari semi-deserts. Although Pianka's (1986) 'L' site is reasonably homogenous with large marble gum eucalypts trees, spinifex and scattered bushes, his 'R' or 'Reds Sands' site consists of a complex mosaic of sandridges and interdunal flats with a vegetation of spinifex (*Triodia basedowii*), marble gum eucalypts (*Eucalypts gongylocarpa*), mallee (*Eucalypts comcinna*) and acacia bushes (*Acacia aneura* and *Acacia craspedocarpa*). James (1994) reports capturing 40 species of lizards in a 50 ha site of spinifex grassland on a dune-swale system, 40 km south of Alice Springs, Australia. The 31 species of lizards and eight species of snakes captured at Atley Station were in two small, very homogeneous areas (less than one square kilometre) during a period of less than 35 days by Pianka and 30 days by myself.

Morton and James (1988), Pianka (1989) and James (1994) suggest there are a wide range of climatic, edaphic and biotic factors that contribute to the diversity and abundance of desert lizards in Australia. Morton and James (1988) suggest that the primary factors are the unpredictable precipitation and nutrient-poor soils, the low and erratic primary productivity and the unique physical structure of the spinifex grasses, the abundance of termite fauna and the fire succession-cycle that contributes to the high diversity. Pianka (1989, 1992a, b) suggests the disturbance resulting from the fire-succession cycle and the spinifex habitat are probably the most important factors that contribute to the high lizard diversity in semi-arid and arid areas of Australia. Spinifex was much more sparse at both Atley sites than at Pianka's Great Victoria Desert sites and the station owner indicted that the area I pit-trapped had not been burnt for at least 50 years. This might suggest that factors other than spinifex and fires are the major contributors to the abundance and diversity of lizards on Atley Station.

ACKNOWLEDGEMENTS

This research was made possible by the financial assistance of Edith Cowan University and the University of Western Australia. I wish thank W. Thompson, S. Thompson and P. Hately for their assistance in digging in the pit-traps, laying fences and routinely checking the traps. Identification of some species by L.A. Smith at the Western Australian Museum was appreciated. I am grateful for the unpublished information provided by E.R. Pianka.

Access to Atley Station by Mr and Mrs Broadhurst was appreciated. All lizards were caught under licence issued by the Department of Conservation and Land Management and animal experimentation on

live specimens was done with the approval of the Animal Welfare Committee of the University of Western Australia.

REFERENCES

JAMES, C.D. 1994. Spatial and temporal variation in structure of a diverse lizard assemblage in arid Australia. In VITT, L.J. and PIANKA, E.R. (eds) *Lizard Ecology: Historical and Experimental Perspectives*, pp. 287–317. Princeton University Press, New Jersey.

MORTON, S.R. and JAMES, C.D. 1988. The diversity and abundance of lizards in arid Australia: a new hypothesis, *The American Naturalist*, 132: 237–256

PIANKA, E.R. 1986. *Ecology and Natural History of Desert Lizards*, Princeton University Press, New Jersey.

PIANKA, E.R. 1989. Desert lizard diversity: Additional comments and some data, *The American Naturalist*, 134: 344–364.

PIANKA, E.R. 1992a. A land of lizards, *Landscope*, 7: 11–16.

PIANKA, E.R. 1992b. Fire ecology, *National Geographic Research and Exploration*, 8: 352–371.